

Scientific Note

AN OUTBREAK OF THE MOTH *ACHAEA SERVA* (FABR.) ON THE MANGROVE *EXCOECARIA AGALLOCHA* (L.)

There have been several reports of lepidopteran larvae causing damage to the foliage of mangroves. One noteworthy case occurred in 1983 when between 5–10 km² of *Excoecaria agallocha* (L.) near Belawan in Northern Sumatra, Indonesia, was almost completely defoliated by caterpillars of the noctuid moth *Ophiusa melicerta* (Fabr.) (Whitten A. J. & S. J. Damanik, 1986. *Biotropica*, 18: 176). Whitten & Damanik's report is intriguing because *E. agallocha* has also been recorded as having one of the lowest levels of leaf damage among mangroves and it has been suggested that *E. agallocha* is relatively resistant to attack by herbivorous insects because it produces a toxic sap (Robertson, A. I. 1991. *Aust. J. Ecol.*, 16: 433–443).

Excoecaria agallocha is common within the landward margins of mixed mangrove stands along the banks of the Fitzroy River, Central Queensland, Australia, as far inland as Rockhampton (23°23'S, 150°31'E). During April 1995 we noticed that the *E. agallocha* within a strip at least 10 km long downstream from Rockhampton were almost completely defoliated. We surveyed the forest in April 1995 and found the mud beneath the *E. agallocha* trees littered with chewed fragments of leaf and numerous caterpillars of the noctuid moth *Achaea serva* (Fabr.) eating the few leaves remaining on the trees.

Within the area of defoliation we also found 3 separate patches, each of which was less than 60 m², where *E. agallocha* showed little or no leaf damage or defoliation. Fresh groundwater (salinity less than 2‰) was running into the mangrove forest from the landward edge of each patch, the boundary of which followed the extent of obvious freshwater seepage and was sharply defined; trees with almost undamaged foliage occurred within 1–2 m of completely defoliated ones. No other patches of freshwater input were found within the defoliated area.

Caterpillars of *A. serva* were present on the undefoliated trees, but stopped feeding and often fell to the ground within a few seconds of starting to feed; the leaves from these trees were rigid and oozed a copious watery latex when snapped across the midrib. In contrast, caterpillars feeding on leaves remaining on almost completely defoliated trees usually consumed the entire leaf apart from the midrib; the leaves were limp and produced little or no latex when snapped.

This may be another example of the outbreak of an herbivorous insect on plants which have become more attractive or susceptible to attack due to drought stress (e.g. White, T. C. R. 1993. *The inadequate environment*. Springer-Verlag, Berlin). From 1993–1995 there was a severe drought in Central Queensland coinciding with the 1993–95 El Niño Southern Oscillation event (Anonymous. 1995. *Monthly weather review for Queensland*. Australian Bureau of Meteorology, Canberra), and we suggest this drought resulted in reduced toxin production by *E. agallocha* and hence the outbreak of *A. serva*. Furthermore, the outbreak of *Ophiusa melicerta* on *E. agallocha* in Indonesia reported by Whitten & Damanik (1986) oc-

curred in January 1983; the year following one of the most extreme El Nino-Southern Oscillation events ever recorded, during which there was severe and widespread drought in Indonesia (Gill A. E. & E. M. Rasmusson. 1983. *Nature*, 306: 229–234).

The current El Nino event appears to have ended and rainfall during the southern hemisphere winter–spring of 1995 (June–November) in Rockhampton was significantly greater than in the same seasons of the previous year (Anonymous 1995). The defoliated *E. agallocha* have grown new leaves and no adults, pupae or caterpillars of *A. serva* were found during subsequent surveys in September 1995 or April 1996.

We think our observations are noteworthy for two reasons. First, they have resulted in an hypothesis which can explain two outbreaks of noctuids on *E. agallocha*. Second, considering that *A. serva* has been reported on castor, *Ricinus communis* L. (Common, I. F. B. 1990. *Moths of Australia*. Melbourne University Press, Melbourne), the outbreak on *E. agallocha* emphasises that species which have become more susceptible to herbivores due to drought stress may temporarily increase the effective host range (and thus perhaps the population density) of polyphagous pests of commercial crops. We intend to continue monitoring *E. agallocha* in Rockhampton because a future drought may provide an opportunity to test the above-mentioned hypothesis by experimentally irrigating parts of the mangrove swamp.

Acknowledgment.—The Rockhampton City Council allowed access to the mangrove forest and Dr. Bob Newby identified *Achaea serva*.

Stephen C. McKillup and Ruth V. McKillup, *Department of Biology, Central Queensland University, Rockhampton, Queensland 4702 Australia.*

Received 1 Jul 1996; Accepted 30 Sep 1996.